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## REMARKS

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The Applicants respectfully request reconsideration of this application in view of the above amendments and the following remarks.

## Drawings

The Examiner has objected to the drawings.

Applicants respectfully submit that replacement drawings overcoming the rejection were submitted in the Response to Notice of Non-Compliant Amendment that was mailed on April 17, 2006.

## Claim Objections

(1) The Examiner has objected to claim 43. In particular, the Examiner has asserted that claim 43 fails to further limit the subject matter of a previous claim (presumed to be claim 32).

Applicants respectfully disagree. Claim 32 recites "*an LED disposed vertical relative to the microresonator*", whereas claim 43 recites that "*the LED is disposed on top of the microresonator*". Claim 32 does not require that the LED is disposed on top of the microresonator, just that the LED is disposed vertical relative to the microresonator. For example, in claim 32 the LED may be below the microresonator. Accordingly, claim 43 further limits the subject matter of claim 32, and the rejection is believed to be improper.

(2) The Examiner has objected to claim 55. Applicants respectfully submit that claim 55 has been cancelled.

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(3) The Examiner has objected to claim 32. Applicants respectfully submit that claim 32 has been amended to overcome the objection.

(4) The Examiner has objected to claim 44. Applicants respectfully submit that claim 44 has been amended to overcome the objection.

**35 U.S.C. §103(a) Rejection – Armani, Chan, LoCascio**

The Examiner has rejected claims 32-60 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application No. 2004/0179573 issued to Armani et al. (hereinafter “Armani”) in view of U.S. Patent No. 6,236,060 issued to Chan et al. (hereinafter “Chan”) and in view of U.S. Patent Application No. 2003/0016907 issued to LoCascio et al. (hereinafter “LoCascio”). The Applicants respectfully submit that the present claims are allowable over Armani, Chan, and LoCascio.

Claim 32 recites an apparatus comprising “*a silicon substrate; a microresonator disposed on the silicon substrate, the microresonator having an annular structure to recirculate light at a desired wavelength, the microresonator including nanocrystals in a matrix; and an LED disposed vertically relative to the microresonator to excite recirculation of light in the microresonator*”. Armani, Chan, and LoCascio do not teach or suggest an LED disposed vertically relative to the microresonator to excite recirculation of light in the microresonator. Paragraph [0081] of LoCascio discusses that a high intensity control beam can illuminate the ring from above, however this is a control beam to control or change the refractive index of the absorber material. There is no teaching or suggestion that the beam is a pump that excites recirculation of light in the microresonator. Furthermore, this beam has high intensity and there is no teaching or suggestion that it could be an LED, let alone a low power LED. Accordingly, for at least this reason, claim 32 and its dependent claims are believed to be allowable.

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Claim 45 recites an apparatus comprising “*a silicon substrate; a microresonator disposed on the silicon substrate, the microresonator having an annular structure to recirculate light at a desired wavelength, wherein the microresonator includes silicon nanocrystals, silicon-germanium nanocrystals, or a combination thereof; a patterned waveguide disposed above and optically coupled with the microresonator; and a pump disposed above or below the microresonator to excite circulation of light in the microresonator*”.

Armani, Chan, and LoCascio do not teach or suggest either a patterned waveguide disposed above a microresonator or a pump disposed above or below the microresonator to excite circulation of light in the microresonator. Paragraph [0081] of LoCascio discusses that a high intensity control beam can illuminate the ring from above, however this is a control beam to control or change the refractive index of the absorber material. There is no teaching or suggestion that the beam is a pump that excites recirculation of light in the microresonator. Accordingly, for at least this reason, claim 45 and its dependent claims are believed to be allowable.

Claim 57 recites an apparatus comprising “*a silicon substrate; a microresonator disposed on the silicon substrate, the microresonator having an annular structure to recirculate light at a wavelength, the microresonator including nanocrystals comprising silicon in an Al-SiO<sub>x</sub> matrix; and a patterned waveguide optically coupled with the microresonator*”.

Armani, Chan, and LoCascio do not teach or suggest either an Al-SiO<sub>x</sub> matrix or the combination of nanocrystals comprising silicon in an Al-SiO<sub>x</sub> matrix. The Examiner has stated that “AlSiO<sub>x</sub> and silicon are known to be equivalent for their use in the optical semiconductor art”. Applicants respectfully disagree, and respectfully request that the Examiner provide a reference clearly showing that Al-SiO<sub>x</sub> and silicon would be equivalent in the claimed use with nanocrystals. Otherwise, the rejection should be withdrawn. Accordingly, for at least this reason, claim 57 and its dependent claims are believed to be allowable.

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**Conclusion**

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance. Applicants respectfully request that the rejections be withdrawn and the claims be allowed at the earliest possible date.

**Request For Telephone Interview**

The Examiner is invited to call Brent E. Vecchia at (303) 740-1980 if there remains any issue with allowance of the case.

**Request For An Extension Of Time**

The Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

**Charge Our Deposit Account**

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 9/21/06

  
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